X. NOTES ON PEDIPALPI IN THE COLLECTION OF THE INDIAN MUSEUM.

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III.—Some new and imperfectly known species of Hypoctonus.

With the exception of *H. andersoni*, Oates, and *H. stoliczkae*, n. sp., all the specimens on which the following descriptions are based have been added to our collection during the last year. Figures will be published in a subsequent paper dealing with the Oriental Pedipalpi as a whole, in which also I propose to discuss generic definitions in the light of the facts here published.

A.—Species with tibial spurs on the last pair of legs only.

H. dawnae, n. sp.

This species is abundant on the eastern slope of the Dawna hills in the Amherst District of Lower Burma from Sukli near the top of the range to Thingannyinaung at the bottom. I obtained a single specimen from Misty Hollow near the top of the western slope. It may, perhaps, be found over the whole of both slopes in the rains.[1] The presence of a distinct though faint and incomplete ridge between the eyes might seem to indicate that the species ought to be placed in the genus *Thelyphonus*. In all other respects, however, it is a typical *Hypoctonus*. The form of the tibial apophysis of the male especially is that of a *Hypoctonus* and not a *Thelyphonus*.

Description.— ♂. Length of carapace 9·5–10·5 mm., maximum breadth 5·5—6 mm. Colour black above, with reddish-brown legs; beneath the body and arms are redder though darker than the legs. Carapace usually smooth in front and at the sides, more or less transversely rugose behind the median pair of eyes which eyes are separated from one another by a ridge whose width is about equal to the diameter of each eye. Behind this rugose area two coarsely granular bands extend backwards, one on either side of a median furrow of varying distinctness, each of them separated by a somewhat narrower smooth band from a distinct though not very strong granular ridge which extends forwards from the lateral eyes towards the median ones as in the genus *Thelyphonus*, disappearing about halfway between the two. The whole of the posterior part

[1] My collections were made towards the end of November only.

of the carapace is granular. Terga of abdomen finely granular. Trochanters and femora of second to fourth legs and tibiae of fourth legs granular above, the femora becoming smooth distally. Abdominal sterna finely and closely granular at the sides, finely but less coarsely granular between the muscular impressions on the fifth and sixth (fourth and fifth visible) segments. Arm and hand normally smooth and polished throughout above with only a few sparse punctures.[1] Trochanter with five strong teeth above and two below, the space between these two sets of teeth armed with more or less distinct rows of small denticles; femur and tibia rather large, the former armed with a stout spine below and the latter with a more or less distinct denticle (sometimes obsolete) below and a conspicuous conical process (sometimes double) at the base of the apophysis above; apophysis triangular in section, broad and flat above, strongly grooved along the anterior face, truncate distally, upper anterior margin slightly concave, posterior margin slightly concave proximally slightly convex distally, the former margin meeting distal margin in an even curve, the latter in a dentiform acute angle, distal margin armed in addition with one spiniform tooth. Inner margin of hand denticulate throughout and concave at base of fixed finger; fixed finger denticulate on both sides; moveable finger long and evenly curved; hand armed at base of moveable finger with two stout spines of which the anterior is remarkably large. Foot of antenniform leg evidently very liable to injury and specimens with an abnormal number of joints on one side at least are abundant, the long terminal joint being apparently the first to be regenerated since it is always present when the appendage is healed; normally the joints are moderately long, but the proportions they bear to one another are not altogether constant

♀. Size, colour, and general texture of integuments as in the male. Arm and hand much smaller than in male, tibial apophysis triangular, with a simple denticle at base, two more just below apex, and a row along anterior margin; second (i.e. first visible) abdominal sternum more than twice as broad as long, posterior margin slightly concave on either side, being moderately produced in the middle line with the convexity thus formed broadly rounded, impressions very faint, apparently four in number, one pair situated close together with another pair even fainter outside and slightly behind them tinged with a faint greyish streak; immediately behind the central pair the sternum is clouded with black; the concave portion of the posterior margin on either side of the median lobe and immediately behind the outer impressions is likewise blackened

H. browni, n. sp.

The following description is based on the examination of a single specimen found by Mr. J. Coggin Brown at Parni, Monglong,

[1] In a single specimen the arm and hand are slightly dulled by a very fine rugosity which is most marked at the base of the tibial apophysis and fixed finger.

Hsipaw State, North Shan States, Upper Burma. The species is very closely allied to the preceding and may be only a variety of it; but until the male is found this question cannot be settled.

Description.—♂. Unknown.

♀. Length of carapace 8·5 mm., maximum breadth 5 mm. Texture of integuments as in *H. dawnae*, but with the median finely punctured areas of the fifth and sixth abdominal sterna very narrow. Legs of a much darker colour than in the preceding species, the coxae and trochanters above and the femora being almost black. Arm and hand as in the preceding species. Second (first visible) abdominal sternum a little less produced behind than in that species, the posterior margin being almost straight on each side instead of distinctly concave, otherwise the same

H. andersoni (Oates).

No specimen of this species appears to have been found since Oates originally described it from two specimens obtained by the Yunnan Expedition. The badly mutilated specimen which he described as the female cannot, I think, be mature, and the female of the species must be regarded as still unknown, the description of an immature specimen of *Hypoctonus* being worthless.

The male, as is well shown in Oates' figure (1889, pl. II, fig. 12) is one of the most distinct species hitherto described (though closely allied to *H. ellisi* described below), and it is difficult to see how Kraepelin (1897, p. 49, and 1899, p. 231) could possibly come to regard it as a variety of *H. formosus*. In reality it must be classed with Kraepelin's *H. gastrotrichus* on account of the presence of tibial spurs on the last pair of legs only.[1] As Oates

[1] *H. kraepelini*, Simon, also belongs to this group. Simon's description of this species (1901, pp. 77-8) is inadequate and his statement that it is closely related to *H. saxatilis*—more so, one is led to assume, than to any other known species—is misleading. The type specimens (one mature specimen and several young) from Bukit Goah, in the State of Jalor (Siamese Malay States) at an altitude of less than five hundred feet above sea level [I am indebted to Dr. Annandale for the correct spelling of this locality together with information as to the altitude at which he obtained the specimens], have been sent me for examination by Mr. Doncaster, the Curator of the Cambridge Museum, to the collections of which they belong; they may be redescribed as follows :—

♀. Length of carapace 11 mm., maximum breadth of carapace 6 mm. Carapace more extensively granular and rugose than in *H. ellisi* (see below), granulation of legs weaker. Colour much as in that species but slightly darker. Arm and hand resembling those of the female of *H. ellisi* in all points except that the tibia and hand are somewhat more elongated, each being about 1½ times as long as broad. The outermost tooth of the trochanter of the right arm is double in the only mature specimen I have seen, but this is no doubt an abnormality—it does not occur either in the left arm or in any of the young specimens. Second (i.e. first visible) abdominal sternum about twice as broad as long, posterior margin on each side perceptibly but very slightly more concave than in *H. ellisi*, the rounded middle portion somewhat less obtuse but scarcely produced, impressions very obscure, apparently four in number arranged in a curve opposite the rounded middle portion of the posterior margin with which they enclose a broadly *navicula*-shaped area, the outer pair of impressions tinged with black. Tibial spurs confined to last pair of legs except in the one mature specimen in which one is also present on the second (but not third) right (but not left) leg, which is clearly an abnormality.

makes no mention of this feature and as only the female of *H. gastrotrichus* is known, it is not to be wondered at that Pocock (1900), though he refused to follow Kraepelin in regarding *H. andersoni* as a variety, did not succeed in placing it correctly.

H. ellisi, n. sp.

Mr. C. E. Milner, of the Indian Forest Service, to whom I wrote in the hope of obtaining the unknown female of *H. sylvaticus*, sent me some time ago six specimens of *Hypoctonus* collected by Mr. Ellis in the Zigon Division (Burma) under rocks during blasting operations in connection with a road in the Yoma north-east of Zigon town. Three of these proved to be *H sylvaticus*, whilst three (one male and two females) belong to a new species closely allied to *H. andersoni*.

Description— ♂. Length of carapace 8 mm., maximum breadth 4·5 mm.; colour of body and arms dark brown above, that of legs pale brown; surface of carapace smooth at sides and transversely rugose in middle in front of lateral eyes, finely granular throughout behind, incompletely grooved in the middle line; terga of abdomen finely granular throughout; trochanters and femora of of 2—4th legs and tibiae of 4th legs finely granular above; anterior half of hand finely granular below; posterior lateral angles of 1st, whole of 2nd, 3rd and 4th, sides of 6—8th visible abdominal sterna finely and closely punctured and more or less transversely striate; rest of surface of body and appendages smooth and polished or sparsely punctured. Arm with a conspicuous denticle dorsal to the coxal process which is rather long and slender; upper margin of trochanter entirely without teeth, anterior surface with two or three vertical rows of denticles, one obsolete tooth on lower margin; femur very sparsely punctured, rather slender, its free inner edge about equal to anterior margin of trochanter, one obsolete denticle on lower side; tibia also very sparsely punctured, stem of tibial apophysis slender, lightly curved in the middle, expanded on the anterior edge of the upper side at first gradually then very abruptly into a flattened and downwardly curved blade which ends abruptly just before the narrow pointed extremity, lower edge of posterior side likewise expanded below the tip but thicker and the expansion nowhere abrupt; hind margin of dorsal expansion not produced backwards as in *H. andersoni*. Hand somewhat massive; fixed finger very broad, its inner margin strongly convex with the distal half very hairy, outer border finely denticulate; moveable finger with strongly curved and somewhat hairy basal portion, grooved along upper and lower and less strongly along outer margin, and followed by an abruptly defined distal portion which is straighter, slenderer, smoother, and sharply pointed at its extremity.

♀. Length of carapace 9·0—9·5 mm., maximum width of same 5·0 mm. Colour, granulation, etc. as in male except for absence of all granules from lower surface of hand. Coxal process of arm shorter than in the male, with denticles above it less

conspicuous; trochanter with five long marginal teeth above and two stouter ones below, anterior surface with rows of denticles as in male; femur much shorter than in male, armed with one tooth on lower surface, with or without a smaller one above; tibia and hand each about as broad as long, former larger than latter; tibia with one tooth above at base of apophysis and one below close to anterior margin; hand with two teeth below, the anterior and larger one close to anterior margin, the other immediately behind it; tibial apophysis with two teeth on posterior side near apex, very strongly toothed on anterior side; inner side of hand (including fixed finger), hardly perceptibly concave, toothed throughout except close to base and distal extremity, apposable margins of both fingers more finely denticulate except distally where they are smooth, moveable finger shorter and less strongly curved than in male, its lower margin strongly denticulate. Second (i.e. first visible) abdominal sternum twice as broad as long, posterior margin not produced, being practically straight on each side and very obtusely rounded in the middle; anterior margin raised up to form a strong transverse ridge in front of a pair of large and deep circular pits situated not far from one another on either side of the middle line.

B.—Species with tibial spurs on both third and fourth pairs of legs.

H. oatesii, Poc.

Of this species only the male has as yet been described. Mr. G. Mackrell of the Lungla (Sylhet) Tea Co. has however succeeded in obtaining both sexes for me from Shamshernager, Sylhet, at an altitude of about 100 feet.

Description.—♂. See Pocock, 1900, pp. 112—3.

♀. Length of thorax 10 mm., maximum breadth 5·5. Colour and texture of integuments as in male, except that the arms are not so strongly granular and the anterior abdominal sterna are not rugose at the sides Trochanter as in male but with teeth of upper margin longer and sharper, the anterior margin moreover meeting the inner margin in a somewhat sharper angle. Femur much shorter than in male, armed with one small tooth above and one long one below; tibia and hand as in female of *H. ellisi*. Second (i.e. first visible) abdominal sternum scarcely half as long as broad, posterior margin not abruptly produced in middle; one pair of distinct circular impressions present.

H. sylvaticus, Oates.

Of this species only the male has as yet been described. I am indebted to Mr. C. E. Milner for specimens of both sexes which were captured for him by Mr. Ellis under rocks in the Zigon Division (Burma) in the Yoma N. E. of Zigon town during blasting operations in connection with a road.

Description.—♂. See Oates, 1889, pp. 18—9, and Pocock, 1900, pp. 115—6.

The colour of the legs of the Indian Museum specimen are uniformly pale as in *H. saxatilis*, but the specimen agrees perfectly with *H. sylvaticus* and not with *H. saxatilis* in structure.[1]

♀. Length of carapace 9·0—9·5 mm.; maximum breadth 5 mm. Colour and texture of integuments as in the male except for the absence of any sign of the extraordinary rugosity of the sides of the anterior abdominal sterna found in that sex. Trochanter of arm with five distinct teeth above and two below; femur shorter than in male, armed with several strong granules on the inner side above and one tooth below; tibia and hand as in the preceding species. Second (i.e. first visible) abdominal sternum scarcely half as long as broad, distinctly and more or less abruptly produced in the middle; one pair of distinct but very broad and shallow circular impressions present.

H. stoliczkae, n. sp.

The three specimens (♂, ♀, and juv.) from which this species is described are all from Punkarbari, and are apparently those from that locality referred to by Stoliczka (1873, pp. 127 and 134—136) under the name *Thelyphonus* (conf.) *angustus*. Oates (1889, p. 6) states that these are referable to the young of *Uroproctus assamensis*, a species which they resemble in the presence of a tooth on the inner side of each coxal process of the arm. Of the ridge between the median and lateral eyes there is however no trace. As the species is obviously related to forms belonging to the Burmese genus *Hypoctonus* (especially *H. wood-masoni*) and not to those of the South Indian genus *Labochirus* I have referred it to the genus *Hypoctonus* in spite of the presence of teeth on the coxal process, although this will necessitate a revision of the generic definition.

Description.—♂. Length of thorax 12 mm., maximum breadth 7 mm. Colour dark brown throughout. Carapace granular (almost spinulose) throughout, granules coarser in front than behind; trochanters and femora of 2—4th legs and tibia of 4th legs granular above; arms, except their coxae which are striate and sparsely punctured, and inner side of remaining joints strongly granular, abdominal terga also granular throughout; abdominal sterna granular at sides only, those of the first three ventrally visible segments being much more coarsely marked than the rest and almost rugose. Coxal process of arms with one or two [2] more or less distinct teeth on the inner margin near the apex and sometimes one on the outer margin also, one tooth also dorsal to base of coxal process; trochanter armed with one or two teeth below and five somewhat obscure teeth above, anterior surface with rows of denticles; femur moderately stout, its free inner margin

[1] This is not the only case in which I have found the colour of the legs to be misleading. Structure I believe to be alone reliable.

[2] The two arms of the single specimen before me differ greatly in the extent to which they are armed with spines and teeth.

quite as long as anterior margin of trochanter, with or without one strong tooth below; tibia about as wide as long, stouter than femur, one small tooth below close to anterior margin at base of moveable finger, front margin oblique, the inner side above being about 1½ times as long as the outer; posterior side of tibial apophysis curved, slightly expanded dorso-ventrally at the end, lower anterior margin produced towards the hand to form an extensive plate widening gradually from its commencement at about ⅓ of the distance from the base of the apophysis to its extremity and terminated abruptly a little before the end. Hand very thick dorso-ventrally on the outer side; inner side thin, widely excavate at base of fixed finger, the excavation exactly fitting the ventral plate-like expansion of the anterior margin of the tibial apophysis when the two are brought together; fixed finger broad, roughly parallel-sided, almost vertically truncate distally; moveable finger evenly curved, the apex crossing beneath the moveable finger when closed, and apposable to extremity of plate-like expansion of tibial apophysis.

♀. Length of cephalothorax 10 mm., maximum breadth of same 6 mm., colour much paler than in male [1] and granulation weaker throughout. Coxal process of arm as in male; trochanter with marginal teeth well developed; femur thinner and proportionally shorter than in male, armed with one weak tooth above and one very strong one below; tibia and hand scarcely longer than broad, armed as in *H. ellisi*, *H. wood-masoni*, etc. Second (first visible) abdominal sternum about twice as broad as long, middle of posterior margin somewhat abruptly produced, surface traversed by a fine groove extending slightly forwards across the middle-line from about the middle of each half of this margin, a single pair of moderately distinct circular impressions situated about half-way between this groove and the anterior margin of the segment.

IV. New Oriental Tartarides.

Schizomus (*s. str.*) *cavernicola.*

Locality.—This species lives under stones in the depths of the larger of the two famous Farm or Khayon caves near Moulmein where I obtained two specimens, both adult females. I also saw, but failed to capture, some immature specimens, probably of the same species, that were living under stones in a crevice which forms the approach to an upper entrance of the small cave.

♂. Unknown.

[1] I believe that the colour of these animals is to some extent affected not only by age and by the recency of the last moult but also by the mode of preservation (e.g. the strength and nature of the spirit) employed. In the present instance, however, in view of the small size of this specimen in comparison with the male, it probably indicates that the specimen is scarcely mature; distinctive characters of the anterior abdominal sterna are already developed but they will probably be found to be intensified in perfectly matured specimens.